ENGINEERING EVALUATION
Verizon Wireless #815029
P#16601-A#11185
536 Lewelling Blvd.
San Leandro, CA 94579

BACKGROUND

Verizon Wireless #815029 has applied for an Authority to Construct and/or Permit to Operate the following equipment:

S-1 Emergency Standby Generator Set: Diesel Engine Make: John Deere; Model: SD060; Rated Horsepower: 96 HP

The standby generator will be located at 536 Lewelling Blvd, San Leandro, CA 94579. In order to meet the district emission standards (RSA), applicant has agreed to accept a reduction in permitted non-emergency operation hours to 33 hours per year. Due to its location within 500 feet of Community Christian High School, the testing or maintenance may not be conducted between 7:30 AM and 3:30 PM on days when schools are in session.

EMISSIONS SUMMARY

Annual Emissions:

The manufacturer-supplied, ISO 8178-D2 test-cycle emission factors for S-1 (96 HP- diesel engine) that are listed below in Table (1). For this report, it is assumed that the emission value of Total Unburned Hydrocarbons (HC) is equivalent to the emission value of POC. The carbon monoxide (CO) emissions from this engine is below the detectable level, therefore the CO emission factor is taken from same size CARB certified engine.

Table (1)

Component	Emission (g/kw·hr)	Emission (g/bhp·hr)
NOx	6.598	4.920
CO	1.005	0.750
POC	0.353	0.263
PM_{10}	0.121	0.090
SO_2*	0.250	0.184

**The emission factor for SO2 is from Chapter 3, Table 3.4-1 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors.*
SO_2 8.09E-3 (% S in fuel oil) lb/hp-hr = 8.09E-3 (0.05% S) (454 g/lb) = 0.184 g/hp-hr

The diesel particulate emissions estimate used in this analysis is based on an emission factor of 0.09 g/bhp-hr. This factor is specific to the Model 5030HF270 and is based on ISO 8178-D2 test cycle weighted factors. For 33 hours per year of operation, the annualized diesel particulate rate is 0.63 lbs/yr. The CARB certification uses the highest emission rates for this engine family. However, we used emission rates that were based on ISO 8178-D2. The tests were submitted to CARB for certification. Since the emissions are not yet certified by CARB, the permit condition will limit emissions to the factors used in the analysis.

Maximum Emissions in Tons per year:

Table (2)

NOx	= (4.920 g/bhp-hr)(96 hp)(33 hrs/yr)(1lb/453.6g) = 34.36 lb/yr = 0.017 TPY
CO	= (0.750 g/bhp-hr)(96 hp)(33 hrs/yr)(1lb/453.6g) = 5.23 lb/yr = 0.003 TPY
POC	= (0.263 g/bhp-hr)(96 hp)(33 hrs/yr)(1lb/453.6g) = 1.84 lb/yr = 0.001 TPY
PM_{10}	= (0.090 g/bhp-hr)(96 hp)(33 hrs/yr)(1lb/453.6g) = 0.63 lb/yr = 0.000 TPY
SO_2	= (0.184 g/bhp-hr)(96 hp)(33 hrs/yr)(1lb/453.6g) = 1.30 lb/yr = 0.001 TPY

Maximum Daily Emissions:

A full 24-hour day will be assumed since no daily limits are imposed on intermittent and unexpected operations. Check Table (3) for emissions per day.

Table (3)

NOx	= (3.746 g/bhp-hr)(96 hp)(24 hrs/day)(1lb/453.6g) = 24.99 lb/day
CO	= (0.750 g/bhp-hr)(96 hp)(24 hrs/day)(1lb/453.6g) = 3.81 lb/day
POC	= (0.196 g/bhp-hr)(96 hp)(24 hrs/day)(1lb/453.6g) = 1.34 lb/day
PM_{10}	= (0.067 g/bhp-hr)(96 hp)(24 hrs/day)(1lb/453.6g) = 0.46 lb/day
SO_2	= (0.184 g/bhp-hr)(96 hp)(24 hrs/day)(1lb/453.6g) = 0.95 lb/day

Plant Cumulative Increase: (tons/year): Cumulative increase from the plant is as shown in Table (4).

Table (4)

Pollutant	Existing tons/yr.	New tons/yr.	Total tons/yr.
NOx	0	0.017	0.017
CO	0	0.003	0.003
POC	0	0.001	0.001
PM10	0	0.000	0.000
SO_2	0	0.001	0.001
NPOC	0	0.000	0.000

Toxic Risk Screening:
The toxic emission of diesel particulate does not exceed the District Risk Screening Trigger level, as shown in Table (5), therefore Risk Screening Analysis is not necessary for this engine.

Table (5)

Source	PM_{10} Emission Factor (g/HP-hr)	HP	Annual Usage (Hours/year)	Diesel Exhaust Particulate Emissions (lb/year)	Trigger Level (lb/yr)	Risk Screen Required? (Yes/No)
1	0.067	96	33	0.63	0.64	Yes

Calculation:

PM_{10} from CARB Certified levels 0.121 (g/kW-hr) / 1.341 (hp/kW) = 0.090 (g/hp-hr)
Diesel Exhaust Particular Emission (lb/yr.) = PM_{10} (g/hp-hr) * HP * Annual Usage (hr/yr)
= 0.090 * 96 * 33
= 285.12 g/yr / 453.6 g/lb
= 0.63 lb/yr

STATEMENT OF COMPLIANCE

S-1 will be operated as emergency standby engines and therefore are not subject to the emission rate limits in Regulation 9, Rule 8 ("NOx and CO from Stationary Internal Combustion Engines"). S-1 is subject to the monitoring and record keeping requirements of Regulation 9-8-530 and the SO_2 limitations of 9-1-301 (ground-level concentration) and 9-1-304 (0.5% by weight in fuel). Regulation 9-8-530 requirements are incorporated into the proposed permit conditions. Compliance with Regulation 9-1 is expected since diesel fuel with a 0.05% by weight sulfur is mandated for use in California. Like all sources, S-1 is subject to Regulation 6 ("Particulate and Visible Emissions"). These engines are not expected to produce visible emissions or fallout in violation of this regulation and they will be assumed to comply with Regulation 6 pending a regular inspection.

The diesel engine is subject to the Stationary Diesel Engine Airborne Toxics Control Measure and is considered a new stationary emergency standby diesel engine since it will be after January 1, 2005 and is large than 50 Hp.

This application is considered ministerial under the District's proposed CEQA guidelines (Regulation 2-1-312) and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors in accordance with Permit Handbook Chapter 2.3.

Best Available Control Technology:

In accordance with Regulation 2, Rule 2, Section 301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NOx, CO, SO_2 or PM_{10}.

Based on the emission calculations above, the owner/operator of S-1 is subject to BACT for the following pollutants: POC, NOx and CO. BACT 1 levels do not apply for 'engines used exclusively for emergency use during involuntary loss of power' as per Reference b, Document 96.1.2 of the BAAQMD BACT Guidelines for IC Engines. Hence, the owner/operator has to the meet BACT 2 limits presented below in Table (6).

Table (6)

POLLUTANT	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice 3. TBACT	TYPICAL TECHNOLOGY
POC	1. ***0.30 g/bhp-hr*** *[62 ppmvd @ 15% O_2]* [a,b] 2. ***1.5 g/bhp-hr*** *[309 ppmvd @ 15% O_2]* [b]	1. *Catalytic Oxidation and CARB or EPA (or equivalent) low-total hydrocarbon emitting certified engine* [a,b] 2. *CARB or EPA (or equivalent) low-total hydrocarbon emitting certified engine b,c*
NOx	1. ***1.5 g/bhp-hr*** *[107 ppmvd @ 15% O_2]* [a,b] 2. ***6.9 g/bhp-hr*** *[490 ppmvd @ 15% O_2]* [a,b,c] ***3. 69 g/bhp-hr*** *[490 ppmvd @ 15% O_2]*	1. *Selective Catalytic Reduction (SCR) + Timing Retard + Turbocharger w/ Intercooler* [a,b] 2. *Timing Retard $\leq 4^o$ + Turbocharger w/ Intercooler* [a,b,c] 3. *Timing Retard $\leq 4^o$ + Turbocharger w/ Intercooler*
CO	1. *n/s* 2. 2.75 ***g/bhp-hr*** *[319 ppmvd @ 15% O2]* [b,c]	1. *Catalytic Oxidation* [b] 2. *CARB or EPA (or equivalent) low-CO emitting certified engine b,c*

For POC, NOx, and CO, the emission limits set by BACT 2 are met, as shown in Table (7) below.

Table (7)

Pollutant	Engine Emission Factors with Catalyst (g/hp-hr)	Emission Factor Limits as set by BACT 2 (g/hp-hr)	Have the limits been met?
POC	0.196	1.5	YES
NOx	3.746	6.9	YES
CO	0.000	2.75	YES

Therefore, S-1 is determined to comply with the BACT 2 limits for POC, NOx and CO. Since the POC, NOx and CO emission factors are not CARB certificated data, the BACT 2 emission limits have been incorporated into the permit conditions and are assumed to comply with through the design standards demonstrated by the CARB certification testing.

Offsets: Offsets must be provided for any new or modified source at a facility that emits more than 10 tons/yr of POC or NOx. Based on the emission calculations above, offsets are not required for this application.

PSD, NSPS, and NESHAPS do not apply.

ATCM: This facility will comply with new ATCM. Compliance with the following permit conditions will meet the ATCM requirements.

PERMIT CONDITIONS

Plant #: 16601; Application #: 11185; Company Name: Verizon Wireless #815029; Condition: #22123; For S-1

1. Hours of Operation: The owner/operator shall operate the emergency standby engine(s) only to mitigate emergency conditions or for reliability-related activities. Operating while mitigating emergency conditions is unlimited. Operating for reliability-related activities is limited to 33 hours per any calendar year.
   [Basis: Regulation 9-8-330]

   "Emergency Conditions" is defined as any of the following:
   a. Loss of regular natural gas supply.
   b. Failure of regular electric power supply.
   c. Flood mitigation.
   d. Sewage overflow mitigation.
   e. Fire.
   f. Failure of a primary motor, but only for such time as needed to repair or replace the primary motor.

   [Basis: Regulation 9-8-231]

   "Reliability-related activities" is defined as any of the following:
   a. Operation of an emergency standby engine to test its ability to perform for an emergency use, or
   b. Operation of an emergency standby engine during maintenance of a primary motor.

   [Basis: Regulation 9-8-232]

2. The owner/operator shall equip the emergency standby engine(s) with either:
   a. a non-resettable totalizing meter that measures the hours of operation for the engine; or
   b. a non-resettable fuel usage meter, the maximum hourly fuel rate shall be used to convert fuel usage to hours of operation.

   [Basis: Regulation 9-8-530]

3. The owner/operator shall not exceed the following emission rates:

NOx	4.920 g/bhp-hr
CO	negligible
POC	0.263 g/bhp-hr
PM10	0.090 g/bhp-hr
SO2	0.187 g/bhp-hr

[Basis: Cumulative Increase and BACT]

4. The owner/operator shall not operate the emergency standby engine(s) for non-emergency use, including maintenance and testing, during the following periods:
   a. whenever there is a school sponsored activity, if the engine is located on school grounds, and
   b. between 7:30 a.m. and 3:30 p.m. on days when school is in session, if the engine is locate within 500 feet of school grounds.

   [Basis: ATCM]

5. Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 2 years and shall make the log available for District inspection upon request:
   a. Hours of operation (total).
   b. Hours of operation (emergency).
   c. For each emergency, the nature of the emergency condition.
   d. Fuel usage for engine(s) if a non-resettable fuel usage meter is utilized.

   [Basis: Regulations 9-8-530 and 1-441]

RECOMMENDATION

Issue an Authority to Construct to Verizon Wireless #815029, Located at 536 Lewelling Blvd., San Leandro, CA 94579:

EXEMPTIONS
None.

By: Madhav Patil Date: 05/12/05

Air Quality Engineering